

CLAIMS

1. An apparatus for time and space switching data from a first and a second input signal to a first and a second output signal, said apparatus comprising at least four switch elements (100; 500), each having a first (110; 510) and a second (120; 520) input port and an output port (150; 550) and comprising:

switching means (130; 530) arranged to provide for time-switching of data received from said first input port to provide an output referring to said output port; and

selecting means (140; 540) for defining a signal to be outputted from said output port by selectively combining said output from said switching means and data received via said second input port, the mutual order of said data received via said second port being the same when incorporated into said signal as when received via said input port,

wherein said elements are arranged so that: the first input port of a first one of said switch elements and the first input port of a second one of said switch elements are connected to receive said first signal;

the first input port of a third one of said switch elements and the first input port of a fourth one of said switch elements are connected to receive said second signal;

the output port of said first switch element is connected to the second input port of said third switch element;

the output port of said second switch element is connected to the second input port of said fourth switch element; and

the output ports of said third switch element and said fourth switch element thereby provides said first and second output signal, respectively.



2. An apparatus as claimed in claim 1, wherein the second input port of said first switch element and the second input port of said second switch element are not  
5 connected to receive any signals.

3. An apparatus as claimed in claim 1 or 2, wherein each one of said elements is arranged to receive data in essentially equally sized frames via at least one of the  
10 input ports of the respective element and to output data in essentially equally sized frames at the output port of the respective element.

4. An apparatus as claimed in any one of the preceding claims, wherein said data is transferred in fixed  
15 size time slots.

5. An apparatus as claimed in any one of the preceding claims, wherein the output from said switching means, and said data from said input port, to said selecting means is provided in frames.  
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6. An apparatus as claimed in any one of the preceding claims, wherein said selecting means is arranged to  
25 select, for each time slot to be outputted from said output port, either a time slot received from said switching means or a time slot received from said second input port.

7. An apparatus claimed in any one of the preceding claims, wherein said selecting means is arranged, when  
30 selecting the n:th slot of a frame to be outputted from said output port, to select either the n:th slot of a frame received from said switching means or the n:th slot  
35 of a frame received from said second input port.



8. An apparatus as claimed in any one of the preceding claims, wherein each one of said switch elements comprises an additional output port (125), wherein data received at the first input port (110) of the respective element is transmitted from said additional output port as received at said first input port, and wherein:

the first input port of said second switch element is connected to receive said first signal by being connected to the additional output port of said first switch element; and

the first input port of said fourth switch element is connected to receive said second signal by being connected to the additional output port of said third switch element.

9. An apparatus for time and space switching data from four or more input signals to four or more output signals, said apparatus including at least four switch elements (500), each having at least four input ports and at least two output ports and comprising:

first switching means (530) arranged to provide for time-and-space-switching of data received from a first one (510) of said input ports to provide an output referring to a first one (550) of said output ports as well as an output referring to a second one (551) of said output ports;

second switching means (531) arranged to provide for time-and-space-switching of data received from a third one (511) of said input ports to provide an output referring to said first output port (550) as well as an output referring to said second output port (551);

first selecting means (540) for defining a signal to be outputted from said first output port (550) by selectively combining the output from said first switching means (530) that refers to said first output port (550), the output from said second switching means (531) that



refers to said first output port (550), and data received via a second one (520) of said input ports, the mutual order of said data received via said second port being the same when incorporated into said signal as when  
5 received via said input port; and

second selecting means (541) for defining a signal to be outputted from said second output port (551) by selectively combining the output from said first switching means (530) that refers to said second output port  
10 (551), the output from said second switching means (531) that refers to said second output port (551), and data received via a fourth one (521) of said input ports, the mutual order of said data received via said fourth port being the same when incorporated into said signal as when  
15 received via said fourth input port,

wherein said elements are arranged so that:

the first input port of a first one of said switch elements and the first input port of a second one of said switch elements are connected to receive a first one of  
20 said input signals;

the third input port of said first switch element and the third input port of said second switch element are connected to receive a second one of said input signals;

25 the first input port of a third one of said switch elements and the first input port of a fourth one of said switch elements are connected to receive a third one of said input signals;

the third input port of said third switch element  
30 and the third input port of said fourth switch element are connected to receive a fourth one of said input signals;

the first and second output port of said first switch element is connected to the second and fourth  
35 input port, respectively, of said third switch element;



the first and second output port of said second switch element is connected to the second and fourth input port, respectively, of said fourth switch element;

the first and second output port of said third  
5 switch element thereby provides a first and a second one, respectively, of said four or more output signals and the first and second output port of said fourth switch element thereby provides a third and a fourth one, respectively, of said four or more output signals.

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10. An apparatus as claimed in claim 9, wherein the second and fourth input port of said first switch element and the second and fourth input port of said second switch element are not connected to receive any signals.

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